JC07 Rec'd PCT/PTO 07 NOV 2001

FORM PTO-1390 (REV. 9-2001) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER		Mo-6762/LeA 33,705
U.S. APPLICATION NO. (If known, see 37 CFR 1.5		To Be Assigned 10/031645
INTERNATIONAL APPLICATION NO. PCT/EP00/03928	INTERNATIONAL FILING DATE 02 May 2000 (2.05.00)	PRIORITY DATE CLAIMED 12 May 1999 (12.05.99)

TITLE OF INVENTION
SUBSTITUTED THIENOCYCLOALK(EN)YLAMINO-1,3,5-TRIAZINE

APPLICANT(S) FOR DO/EO/US KATHER, Kristian, et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [ ] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is attached hereto (required only if not communicated by the International Bureau).
   b. [ ] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [X] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
14. [ ] A SECOND or SUBSEQUENT preliminary amendment.
15. [ ] A substitute specification.
16. [ ] A change of power of attorney and/or address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. [ ] A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [ ] Other items or information:

U S APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
To Be Assigned	PCT/EP00/03928	Mo-6762/LeA 33,705

21. The following fees are submitted:	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**	
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 0.00

CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE	
Total claims	11	- 20 =	0	x **$18.00**	$ 0.00
Independent claims	1	- 3 =	0	x **$84.00**	$ 0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ **$280.00**	$ 0.00
TOTAL OF ABOVE CALCULATIONS =					$ 890.00
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				+	$ 0.00
SUBTOTAL =					$ 890.00
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).					$ 0.00
TOTAL NATIONAL FEE =					$ 890.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +					$ 0.00
TOTAL FEES ENCLOSED =					$ 890.00
				Amount to be refunded:	$
				charged:	$

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 13-3848 in the amount of $ 890.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 13-3848 . A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

00157
PATENT TRADEMARK OFFICE

Raymond J. Harmuth
SIGNATURE

Raymond J. Harmuth
NAME

33,896
REGISTRATION NUMBER

PATENT APPLICATION
Mo 6762
LeA 33,705

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF		)
KRISTIAN KATHER ET AL		) PCT/EP00/03928
SERIAL NUMBER: To Be Assigned		)
FILED:	Herewith	)
TITLE:	SUBSTITUTED THIENOCYCLO-ALK(EN)YLAMINO-1,3,5-TRIAZINES	)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Upon the granting of a serial number and filing date and prior to the examination of the subject application, kindly amend the application as follows. A marked up copy of the claims to show changes is attached to this Preliminary Amendment.

"Express Mail" mailing label number ET709176806US
Date of Deposit November 7, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner of Patents and Trademarks, Washington, D.C. 20231

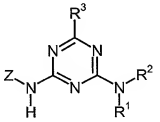
Donna J. Veatch
(Name of person mailing paper or fee)

Signature of person mailing paper or fee)

IN THE CLAIMS:

Please amend Claims 1-11 as follows:

1. (Once Amended) A substituted triazine compound of the Formula (I)



(I),

in which

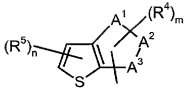
R^1 represents hydrogen or represents optionally substituted alkyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl,

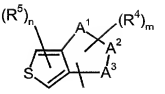
or the grouping $N(R^1R^2)$ also represents dialkylaminoalkylideneamino,

R^3 represents hydrogen, represents halogen, represents optionally substituted alkyl, represents in each case optionally substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, represents in each case optionally substituted alkenyl or alkinyl, or represents optionally substituted cycloalkyl, and

Z represents one of the thienocycloalk(en)yl groupings below



(Z^1)



(Z^2)

in which

m represents the numbers 0, 1, 2, 3 or 4,

n represents the numbers 0, 1 or 2,

A^1 represents O , S , –CO-, -CS- or alkanediyl ,

A^2 represents O , S , –CO-, -CS- or alkanediyl ,

A^3 represents O , S , –CO-, -CS- or alkanediyl ,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl and that two adjacent groups do not simultaneously represent S or O -

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenylcarbonyl, alkinyl-carbonyl, aryl, arylcarbonyl or arylalkyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkyl-carbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkyl-

sulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxy-carbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenyl-carbonyl, alkinylcarbonyl, aryl, arylcarbonyl or arylalkyl.

2. (Once Amended) The compound according to Claim 1, wherein

m represents the numbers 0, 1 or 2,

A^1 represents O , S , -CO-, -CS- or alkanediyl having 1 to 3 carbon atoms,

A^2 represents O , S , -CO-, -CS- or alkanediyl having 1 to 3 carbon atoms,

A^3 represents O , S , -CO-, -CS- or alkanediyl having 1 to 3 carbon atoms,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl having 1 to 3 carbon atoms and that two adjacent groups do not simultaneously represent S or O -

R^1 represents hydrogen or represents optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl having 1 to 6 carbon atoms,

R^2 represents hydrogen, represents formyl or represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy-carbonyl or alkylaminocarbonyl having in each case 1 to 6 carbon atoms in the alkyl groups, or

the grouping $N(R^1R^2)$ represents dialkylaminoalkylideneamino having in each case up to 4 carbon atoms in the alkyl groups or alkylidene groups,

R^3 represents hydrogen, represents halogen, represents optionally cyano-, halogen-, hydroxyl-, C_1-C_4-alkoxy- or C_1-C_4-alkylthio-substituted alkyl having 1 to 6 carbon atoms, represents in each case optionally cyano-,

halogen- or C_1-C_4-alkoxy-substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally halogen-substituted alkenyl or alkinyl having in each case 2 to 6 carbon atoms, or represents optionally cyano-, halogen- or C_1-C_4-alkyl-substituted cycloalkyl having 3 to 6 carbon atoms,

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl-substituted aryl, arylcarbonyl or arylalkyl having in each case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl substituted aryl, arylcarbonyl or arylalkyl having in each case

6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety.

3. (Once Amended) The compound according to Claim 1 wherein

A^1 represents O , S , -CO-, -CS-, methylene, dimethylene or trimethylene,

A^2 represents O , S , -CO-, -CS-, methylene, dimethylene or trimethylene,

A^3 represents O , S , -CO-, -CS-, methylene, dimethylene or trimethylene,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents methylene, dimethylene or trimethylene and that two adjacent groups do not simultaneously represent S or O -

R^1 represents hydrogen or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylaminocarbonyl, ethylaminocarbonyl, n- or i-propylaminocarbonyl, or

the grouping $N(R^1R^2)$ represents dimethylaminomethyleneamino or diethylaminomethyleneamino,

R^3 represents hydrogen, represents fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, bromine-, hydroxyl-, methoxy-, ethoxy-, n- or i-propoxy-, methylthio-, ethylthio-, n- or i-propylthio-substituted methyl, ethyl, n- or i-propyl, n-, i- or s-butyl, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy- substituted acetyl, propionyl,

n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methoxy, ethoxy, n- or i-propoxy, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, represents in each case optionally fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl or butinyl, or represents in each case optionally cyano-, fluorine-, chlorine-, methyl- or ethyl-substituted cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl,

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, , methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxy-

carbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl.

4. (Once Amended) The compound according to Claim 1 wherein

A^1 represents methylene or dimethylene,

A^2 represents methylene or dimethylene,

A^3 represents methylene or dimethylene,

R^1 represents hydrogen,

R^2 represents hydrogen, represents formyl or represents in each case optionally fluorine-, chlorine-, methoxy- or ethoxy-substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, or

the grouping $N(R^1R^2)$ represents dimethylaminomethyleneamino,

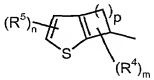
R^3 represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, n- or i-propyl,

R^4 represents cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy, and

R^5 represents nitro, cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy.

5. (Once Amended) The compound according to Claim 1 wherein

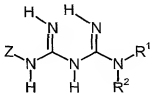
Z represents



where

p represents 2, 3 or 4, and n, m, R^4 and R^5 are as defined in Claim 1 .

6. (Once Amended) A process for preparing the substituted triazine according to the Formula (I) of Claim 1 wherein biguanides of the Formula (II)



(II),

in which

R^1, R^2 and Z are as defined in Claim 1 ,

and/or acid adducts of compounds of the Formula (II)

are reacted with alkoxycarbonyl compounds of the Formula (III)

$$R^3\text{-}CO\text{-}OR' \qquad \text{(III)}$$

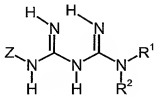
in which

R^3 is as defined in Claim 1 and

R' represents alkyl,

optionally in the presence of a reaction auxiliary and optionally in the presence of a diluent.

7. (Once Amended) A compound of the Formula (II)



(II),

and acid adducts thereof, wherein

R^1, R^2 and Z are as defined in Claim 1.

8. (Once Amended) A process for preparing the compound of the Formula (II) according to Claim 7, wherein an amino compound of the Formula (IV)

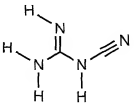
$$Z\text{-}NH_2 \qquad \text{(IV)}$$

in which

Z is as defined in Claim 1 ,

and/or acid adducts of said compound of the Formula (IV)

are reacted with a cyanoguanidine of the Formula (V)



(V)

optionally in the presence of a reaction auxiliary and optionally in the presence of a diluent at temperatures between 100°C and 200°C.

9. (Once Amended) A method for controlling undesirable vegetation, comprising the step of allowing an effective amount of the compound according to Claim 1 to act on said undesirable vegetation and/or its habitat.

10. (Once Amended) A method for controlling undesirable plants comprising the step of allowing an effective amount of a compound according to Claim 1 to act on said undesirable plants and/or their habitat.

11. (Once Amended) An herbicidal composition comprising a compound according to Claim 1 and a member selected from the group consisting of an extender, a surfactant, and combinations thereof.

REMARKS

The amendments to the claims have been made to place the claims in conformance with U.S. patent practice. These amendments are not in derogation of any prior art, and Applicant respectfully asserts that it is entitled to the claims as amended and any equivalents thereof.

Respectfully submitted,

By _____
Raymond J. Harmuth
Attorney for Applicants
Reg. No. 33,896

Bayer Corporation
100 Bayer Road
Pittsburgh, Pennsylvania 15205-9741
(412) 777-8366
FACSIMILE PHONE NUMBER:
(412) 777-8363

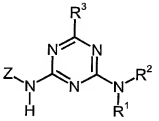
s:/sr/rjh0033

VERSION MARKED TO SHOW CHANGES

IN THE CLAIMS:

Claims 1-11 have been amended as follows:

1. (Once Amended) A substituted triazine ~~C~~compounds of the ~~general f~~Formula (I)



(I),

in which

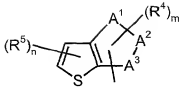
R^1 represents hydrogen or represents optionally substituted alkyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl,

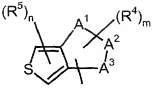
or the grouping $N(R^1R^2)$ also represents dialkylaminoalkylideneamino,

R^3 represents hydrogen, represents halogen, represents optionally substituted alkyl, represents in each case optionally substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, represents in each case optionally substituted alkenyl or alkinyl, or represents optionally substituted cycloalkyl, and

Z represents one of the thienocycloalk(en)yl groupings below



(Z^1)



(Z^2)

in which

m represents the numbers 0, 1, 2, 3 or 4,

n represents the numbers 0, 1 or 2,

A^1 represents O ~~(oxygen)~~, S ~~(sulphur)~~, –CO-, -CS- or alkanediyl ~~(alkylene)~~,

A^2 represents O ~~(oxygen)~~, S ~~(sulphur)~~, –CO-, -CS- or alkanediyl ~~(alkylene)~~,

A^3 represents O ~~(oxygen)~~, S ~~(sulphur)~~, –CO-, -CS- or alkanediyl ~~(alkylene)~~,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl and that two adjacent groups do not simultaneously represent S or O -

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenylcarbonyl, alkinyl-carbonyl, aryl, arylcarbonyl or arylalkyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenylcarbonyl, alkinylcarbonyl, aryl, arylcarbonyl or arylalkyl.

2. (Once Amended) The ~~C~~compounds~~ according to Claim 1, characterized in that~~ wherein

m represents the numbers 0, 1 or 2,

A^1 represents O ~~(oxygen)~~, S ~~(sulphur)~~, -CO-, -CS- or alkanediyl ~~(alkylene)~~ having 1 to 3 carbon atoms,

A^2 represents O ~~(oxygen)~~, S ~~(sulphur)~~, -CO-, -CS- or alkanediyl ~~(alkylene)~~ having 1 to 3 carbon atoms,

A^3 represents O ~~(oxygen)~~, S ~~(sulphur)~~, -CO-, -CS- or alkanediyl ~~(alkylene)~~ having 1 to 3 carbon atoms,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl having 1 to 3 carbon atoms and that two adjacent groups do not simultaneously represent S or O -

R^1 represents hydrogen or represents optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl having 1 to 6 carbon atoms,

R^2 represents hydrogen, represents formyl or represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl having in each case 1 to 6 carbon atoms in the alkyl groups, or

the grouping $N(R^1R^2)$ represents dialkylaminoalkylideneamino having in each case up to 4 carbon atoms in the alkyl groups or alkylidene groups,

R^3 represents hydrogen, represents halogen, represents optionally cyano-, halogen-, hydroxyl-, C_1-C_4-alkoxy- or C_1-C_4-alkylthio-substituted alkyl having 1 to 6 carbon atoms, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally halogen-substituted alkenyl or alkinyl having in each case 2 to 6 carbon atoms, or represents optionally cyano-, halogen- or C_1-C_4-alkyl-substituted cycloalkyl having 3 to 6 carbon atoms,

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl-substituted aryl, arylcarbonyl or arylalkyl having in each case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxy-

carbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl substituted aryl, arylcarbonyl or arylalkyl having in each case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety.

3. (Once Amended) The ~~C~~compounds according to Claim 1 ~~or 2, characterized in that~~ wherein

A^1 represents O ~~(oxygen)~~, S ~~(sulphur)~~, -CO-, -CS-, methylene, dimethylene or trimethylene,

A^2 represents O ~~(oxygen)~~, S ~~(sulphur)~~, -CO-, -CS-, methylene, dimethylene or trimethylene,

A^3 represents O ~~(oxygen)~~, S ~~(sulphur)~~, -CO-, -CS-, methylene, dimethylene or trimethylene,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents methylene, dimethylene or trimethylene and that two adjacent groups do not simultaneously represent S or O -

R^1 represents hydrogen or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxy-

carbonyl, n- or i-propoxycarbonyl, methylaminocarbonyl, ethylaminocarbonyl, n- or i-propylaminocarbonyl, or

the grouping $N(R^1R^2)$ represents dimethylaminomethyleneamino or diethylaminomethyleneamino,

R^3 represents hydrogen, represents fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, bromine-, hydroxyl-, methoxy-, ethoxy-, n- or i-propoxy-, methylthio-, ethylthio-, n- or i-propylthio-substituted methyl, ethyl, n- or i-propyl, n-, i- or s-butyl, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy- substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methoxy, ethoxy, n- or i-propoxy, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, represents in each case optionally fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl or butinyl, or represents in each case optionally cyano-, fluorine-, chlorine-, methyl- or ethyl-substituted cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl,

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, , methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl,

butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl.

4. (Once Amended) The ~~C~~compounds according to ~~any of~~ Claims 1 ~~to 3, characterized in that~~ wherein

A^1 represents methylene or dimethylene,

A^2 represents methylene or dimethylene,

A^3 represents methylene or dimethylene,

R^1 represents hydrogen,

R^2 represents hydrogen, represents formyl or represents in each case optionally fluorine-, chlorine-, methoxy- or ethoxy-substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, or

the grouping $N(R^1R^2)$ represents dimethylaminomethyleneamino,

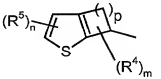
R^3 represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, n- or i-propyl,

R^4 represents cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy, and

R^5 represents nitro, cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy.

5. (Once Amended) The ~~C~~compounds~~ according to any of claims~~ Claim 1 ~~to 4, characterized in that~~ wherein

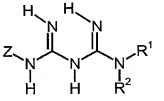
Z represents



where

p represents 2, 3 or 4, and n, m, R^4 and R^5 are as defined in ~~any of~~ Claims~~ 1 to 4~~.

6. (Once Amended) A ~~P~~process for preparing the substituted triazines according to the Formula (I) of ~~any of~~ Claim~~s~~ 1 ~~to 5, characterized in that~~ wherein biguanides of the ~~general f~~Formula (II)



(II),

in which

R^1, R^2 and Z are as defined in ~~any of~~ Claim~~s~~ 1 ~~to 5~~,

and/or acid adducts of compounds of the ~~general f~~Formula (II)

are reacted with alkoxycarbonyl compounds of the ~~general f~~Formula (III)

$$R^3\text{-CO-OR}' \qquad \text{(III)}$$

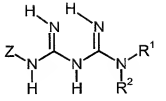
in which

R^3 is as defined in ~~any of~~ Claim~~s~~ 1 ~~to 4~~ and

R' represents alkyl,

~~if appropriate~~ optionally in the presence of a reaction auxiliary and ~~if appropriate~~ optionally in the presence of a diluent~~, and, if appropriate, further conversions within the scope of the definition of the substituents are carried out by customary methods on the resulting compounds of the general formula (I)~~.

7. (Once Amended) A ~~C~~compound~~s~~ of the ~~f~~Formula (II)



(II),

~~characterized in that~~ and acid adducts thereof, wherein

R^1, R^2 and Z are as defined in ~~any of~~ Claims 1~~, to 5,~~

~~and the acid adducts of the compounds of the general formula (II).~~

8. (Once Amended) A ~~P~~process for preparing the compound~~s~~ of the Formula (II) according to Claim 7, ~~characterized in that~~ wherein an amino compounds of the ~~general f~~Formula (IV)

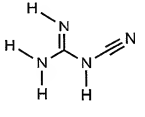
$$Z\text{-}NH_2 \qquad (IV)$$

in which

Z is as defined in ~~any of~~ Claims 1 ~~to 5~~,

and/or acid adducts of said compound~~s~~ of the ~~general f~~Formula (IV)

are reacted with a cyanoguanidine of the ~~f~~Formula (V)



(V)

~~if appropriate~~ optionally in the presence of a reaction auxiliary and ~~if appropriate~~ optionally in the presence of a diluent at temperatures between 100°C and 200°C.

9. (Once Amended) A ~~M~~method for controlling undesirable vegetation, ~~characterized in that~~ comprising the step of allowing an effective amount of the ~~at least one~~ compound according to ~~any of~~ Claims 1 ~~to 5 is allowed~~ to act on said undesirable ~~plants~~ vegetation and/or ~~their~~ its habitat~~s~~.

10. (Once Amended) A method for controlling undesirable plants comprising the step of allowing an effective amount of ~~Use of at least one~~ a compound according to ~~any of~~ Claims 1 ~~to 5 for controlling undesirable plants~~ to act on said undesirable plants and/or their habitat.

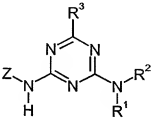
11. (Once Amended) An ~~H~~herbicidal composition~~, characterized in that it comprises~~ comprising a compound according to ~~any of~~ Claims ~~1 to 5~~ and ~~customary~~ a member selected from the group consisting of an extender~~s and/or~~, a surfactant~~s~~, and combinations thereof.

Substituted thienocycloalk(en)ylamino-1,3,5-triazines

The invention relates to novel substituted thienocycloalk(en)ylamino-1,3,5-triazines, to processes for their preparation including the novel intermediates, and to their use as herbicides.

A number of substituted thienylalkylamino-1,3,5-triazines are already known from the (patent) literature (cf. WO-A-98/15537, WO-A-98/15539, DE-A-19744232). However, these compounds have hitherto not attained any particular importance. Substituted thienocycloalk(en)ylamino-1,3,5-triazines have hitherto not been disclosed at all.

This invention, accordingly, provides the novel thienocycloalk(en)ylamino-1,3,5-triazines of the general formula (I)



(I),

in which

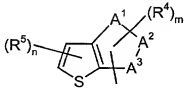
R^1 represents hydrogen or represents optionally substituted alkyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl,

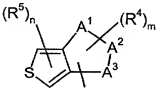
or the grouping $N(R^1R^2)$ also represents dialkylaminoalkylideneamino,

R^3 represents hydrogen, represents halogen, represents optionally substituted alkyl, represents in each case optionally substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, represents in each case optionally substituted alkenyl or alkinyl, or represents optionally substituted cycloalkyl, and

Z represents one of the thienocycloalk(en)yl groupings below



(Z^1)



(Z^2)

in which

m represents the numbers 0, 1, 2, 3 or 4,

n represents the numbers 0, 1 or 2,

A^1 represents O (oxygen), S (sulphur), –CO-, -CS- or alkanediyl (alkylene),

A^2 represents O (oxygen), S (sulphur), –CO-, -CS- or alkanediyl (alkylene),

A^3 represents O (oxygen), S (sulphur), –CO-, -CS- or alkanediyl (alkylene),

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl and that two adjacent groups do not simultaneously represent S or O -

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenylcarbonyl, alkinylcarbonyl, aryl, arylcarbonyl or arylalkyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenylcarbonyl, alkinylcarbonyl, aryl, arylcarbonyl or arylalkyl.

Saturated or unsaturated hydrocarbon groupings, such as alkyl, alkanediyl, alkenyl or alkinyl, are – including in combinations with heteroatoms, such as in alkoxy – in each case straight-chain or branched, as far as this is possible.

Optionally substituted radicals can be mono- or polysubstituted, where in the case of polysubstitution the substituents can be identical or different.

Preferred substituents or ranges of the radicals present in the formulae shown above and below are defined below.

m preferably represents the numbers 0, 1 or 2.

A^1 preferably represents O (oxygen), S (sulphur), -CO-, -CS- or alkanediyl (alkylene) having 1 to 3 carbon atoms.

A^2 preferably represents O (oxygen), S (sulphur), -CO-, -CS- or alkanediyl (alkylene) having 1 to 3 carbon atoms.

A^3 preferably represents O (oxygen), S (sulphur), -CO-, -CS- or alkanediyl (alkylene) having 1 to 3 carbon atoms.

In the preferred compounds, at least one of the groupings A^1, A^2, A^3 represents alkanediyl having 1 to 3 carbon atoms, and two adjacent groups do not simultaneously represent S or O.

R^1 preferably represents hydrogen or represents optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl having 1 to 6 carbon atoms.

R^2 preferably represents hydrogen, represents formyl or represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl having in each case 1 to 6 carbon atoms in the alkyl groups.

The grouping $N(R^1R^2)$ preferably also represents dialkylaminoalkylidene-amino having in each case up to 4 carbon atoms in the alkyl groups or alkylidene groups.

R^3 preferably represents hydrogen, represents halogen, represents optionally cyano-, halogen-, hydroxyl-, C_1-C_4-alkoxy- or C_1-C_4-alkylthio-substituted alkyl having 1 to 6 carbon atoms, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally

halogen-substituted alkenyl or alkinyl having in each case 2 to 6 carbon atoms, or represents optionally cyano-, halogen- or C_1-C_4-alkyl-substituted cycloalkyl having 3 to 6 carbon atoms.

R^4 preferably represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl-substituted aryl, arylcarbonyl or arylalkyl having in each case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety.

R^5 preferably represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl substituted aryl, arylcarbonyl or arylalkyl having in each case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety.

A^1 particularly preferably represents O (oxygen), S (sulphur), -CO-, -CS-, methylene, dimethylene or trimethylene.

A^2 particularly preferably represents O (oxygen), S (sulphur), -CO-, -CS-, methylene, dimethylene or trimethylene.

A^3 particularly preferably represents O (oxygen), S (sulphur), -CO-, -CS-, methylene, dimethylene or trimethylene.

In the preferred compounds, at least one of the groupings A^1, A^2, A^3 represents methylene, dimethylene or trimethylene, and two adjacent groups do not simultaneously represent S or O.

R^1 particularly preferably represents hydrogen or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl.

R^2 particularly preferably represents hydrogen, represents formyl or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylaminocarbonyl, ethylaminocarbonyl, n- or i-propylaminocarbonyl.

The grouping $N(R^1R^2)$ particularly preferably also represents dimethylaminomethyleneamino or diethylaminomethyleneamino.

R^3 particularly preferably represents hydrogen, represents fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, bromine-, hydroxyl-, methoxy-, ethoxy-, n- or i-propoxy-, methylthio-, ethylthio-, n- or i-propylthio-substituted methyl, ethyl, n- or i-propyl, n-, i- or

s-butyl, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy- substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methoxy, ethoxy, n- or i-propoxy, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, represents in each case optionally fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl or butinyl, or represents in each case optionally cyano-, fluorine-, chlorine-, methyl- or ethyl-substituted cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl.

R^4 particularly preferably represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, , methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl.

R^5 particularly preferably represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl,, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl.

A^1 very particularly preferably represents methylene or dimethylene.

A^2 very particularly preferably represents methylene or dimethylene.

A^3 very particularly preferably represents methylene or dimethylene.

R^1 very particularly preferably represents hydrogen.

R^2 very particularly preferably represents hydrogen, represents formyl or represents in each case optionally fluorine-, chlorine-, methoxy- or ethoxy-

substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl.

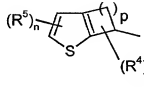
The grouping $N(R^1R^2)$ very particularly preferably also represents dimethylaminomethyleneamino.

R^3 very particularly preferably represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, n- or i-propyl.

R^4 very particularly preferably represents cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy.

R^5 very particularly preferably represents nitro, cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy.

In the general formula (I), Z most preferably represents



where

p represents 2, 3 or 4 and n, m, R^4 and R^5 are as defined above.

The abovementioned general or preferred radical definitions apply both to the end products of the formula (I) and, correspondingly, to the starting materials or intermediates required in each case for the preparation. These radical definitions can be combined with one another as desired, i.e. including combinations between the given preferred ranges.

Preference according to the invention is given to those compounds of the formula (I) which contain a combination of the meanings given above as being preferred.

Particular preference according to the invention is given to those compounds of the formula (I) which contain a combination of the meanings given above as being particularly preferred.

Very particular preference according to the invention is given to those compounds of the formula (I) which contain a combination of the meanings given above as being very particularly preferred.

Most preference according to the invention is given to those compounds of the formula (I) in which Z has the meaning given as being most preferred.

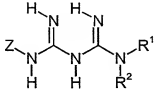
Saturated or unsaturated hydrocarbon radicals, such as alkyl, alkanediyl or alkenyl, are – including in combination with heteroatoms, such as in alkoxy – in each case straight-chain or branched, as far as this is possible.

Optionally substituted radicals can be mono- or polysubstituted, where in the case of polysubstitution the substituents can be identical or different.

If appropriate, the compounds of the general formula (I) according to the invention contain an asymmetrically substituted carbon atom, in which case they can be present in different enantiomeric (R- and S-configured forms) or diastereomeric forms. The invention relates both to the various possible individual enantiomeric or stereoisomeric forms of the compounds of the general formula (I), and to the mixtures of these isomeric compounds.

The novel substituted thienocycloalk(en)ylamino-1,3,5-triazines of the general formula (I) have interesting biological properties. In particular, they have strong herbicidal activity.

The novel substituted thienocycloalk(en)ylamino-1,3,5-triazines of the general formula (I) are obtained when biguanides of the general formula (II)



(II),

in which

R^1, R^2 and Z are as defined above,

– and/or acid adducts of compounds of the general formula (II) -

are reacted with alkoxycarbonyl compounds of the general formula (III)

$$R^3\text{-CO-OR}' \qquad \text{(III)}$$

in which

R^3 is as defined above and

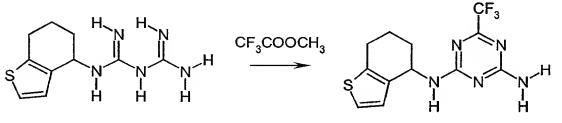
R' represents alkyl,

if appropriate in the presence of a reaction auxiliary and if appropriate in the presence of a diluent

and, if appropriate, further conversions within the scope of the definition of the substituents are carried out by customary methods on the resulting compounds of the general formula (I).

The compounds of the general formula (I) can be converted by customary methods into other compounds of the general formula (I) in accordance with the above definition of the substituents, for example by reacting compounds of the formula (I) in which R^2 represents hydrogen with acylating agents, such as, for example, acetyl chloride, acetic anhydride, propionyl chloride, propionic anhydride, methyl chloroformate or ethyl chloroformate (in the case of R^2 for example introduction of $COCH_3$, COC_2H_5, $COOCH_3$, $COOC_2H_5$ groups for a hydrogen atom).

Using, for example, 1-(4,5,6,7-tetrahydro-benzo[b]thiophen-4-yl)-biguanide and methyl trifluoroacetate as starting materials, the course of the reaction in the process according to the invention can be illustrated by the following formula scheme:



The formula (II) provides a general definition of the biguanides to be used as starting materials in the process according to the invention for preparing compounds of the general formula (I). In the general formula (II), R^1, R^2 and Z preferably or in particular have those meanings which have already been mentioned above, in connection with the description of the compounds of the general formula (I) according to the invention, as being preferred or as being particularly preferred for R^1, R^2 and Z.

Suitable acid adducts of compounds of the formula (II) are their adducts with protic acids, such as, for example, with hydrogen chloride, hydrogen bromide, sulphuric acid, methanesulphonic acid, benzenesulphonic acid and p-toluenesulphonic acid.

The starting materials of the general formula (II) have hitherto not been disclosed in the literature; as novel substances, they also form part of the subject-matter of the present application.

The novel biguanides of the general formula (II) are obtained when amino compounds of the general formula (IV)

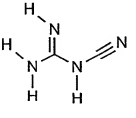
$$Z\text{-}NH_2 \qquad (IV)$$

in which

Z is as defined above,

- and/or acid adducts of compounds of the general formula (IV), such as, for example, the hydrochlorides -

are reacted with cyanoguanidine ("dicyanodiamide") of the formula (V)



(V)

if appropriate in the presence of a reaction auxiliary, such as, for example, hydrogen chloride, and if appropriate in the presence of a diluent, such as, for example, n-decane or 1,2-dichloro-benzene, at temperatures between 100°C and 200°C (cf. the Preparation Examples).

The biguanides of the general formula (II) can, after their preparation, also be employed directly, without intermediate isolation, for preparing the compounds of the general formula (I) by the process according to the invention (cf. the Preparation Examples).

The amino compounds of the general formula (IV) required as precursors are known and/or can be prepared by processes known per se (cf. J. Org. Chem. 18 (1953), 1511-1515; JP-A-03223277 – quoted in Chem. Abstracts 1992:128652 or 116:128652).

The amino compounds of the general formula (IV) are obtained when corresponding cyclic ketones (one of the radicals A^1, A^2 or A^3 then representing –CO-) are reacted with formamide at temperatures between 140°C and 190°C, and the resulting formylamino compound is subsequently hydrolysed by heating with aqueous hydrochloric acid (cf. J. Org. Chem. 18 (1953), 1511-1515), or when the corresponding cyclic ketones are initially, by reaction with hydroxylamine hydrochloride, if appropriate in the presence of a diluent, such as, for example, pyridine, at temperatures between 0°C and 50°C, converted into corresponding oximes and these are then reacted with a reducing agent, such as, for example, sodium borohydride, in the presence of a reaction auxiliary, such as, for example, titanium (IV) chloride, and in the presence of a diluent, such as, for example, 1,2-dimethoxyethane, at temperatures between –20°C and +50°C (cf. the Preparation Examples).

The corresponding cyclic ketones are known and/or can be prepared by processes known per se (cf. J. Chem. Soc. 1953, 1837-1842; J. Heterocycl. Chem. 2 (1965), 44-48; loc. cit. 17 (1980), 87-92; loc. cit. 29 (1992), 1213-1217; J. Pharm. Sci. 52 (1963), 898-901; US-A-3301874).

The formula (III) provides a general definition of the alkoxycarbonyl compounds further to be used as starting materials in the process according to the invention for

preparing compounds of the general formula (I). In the general formula (III), R^3 preferably or in particular has that meaning which has already been mentioned above, in connection with the description of the compounds of the general formula (I) according to the invention, as being preferred or as being particularly preferred for R^3; R' preferably represents alkyl having 1 to 4 carbon atoms, in particular methyl or ethyl.

The starting materials of the general formula (III) are known chemicals for synthesis.

The process according to the invention for preparing the compounds of the formula (I) is, if appropriate, carried out using a reaction auxiliary. Suitable reaction auxiliaries are, in general, the customary inorganic or organic bases or acid acceptors. These preferably include alkali metal or alkaline earth metal acetates, amides, carbonates, bicarbonates, hydrides, hydroxides or alkoxides, such as, for example, sodium acetate, potassium acetate or calcium acetate, lithium amide, sodium amide, potassium amide or calcium amide, sodium carbonate, potassium carbonate or calcium carbonate, sodium bicarbonate, potassium bicarbonate or calcium bicarbonate, lithium hydride, sodium hydride, potassium hydride or calcium hydride, lithium hydroxide, sodium hydroxide, potassium hydroxide or calcium hydroxide, sodium methoxide, ethoxide, n- or i-propoxide, n-, i-, s- or t-butoxide or potassium methoxide, ethoxide, n- or i-propoxide, n-, i-, s- or t-butoxide; furthermore also basic organic nitrogen compounds, such as, for example, trimethylamine, triethylamine, tripropylamine, tributylamine, ethyl-diisopropylamine, N,N,-dimethyl-cyclohexyl-amine, dicyclohexylamine, ethyl-dicyclohexylamine, N,N-dimethyl-aniline, N,N-dimethyl-benzylamine, pyridine, 2-methyl-, 3-methyl-, 4-methyl-, 2,4-dimethyl-, 2,6-dimethyl-, 3,4-dimethyl- and 3,5-dimethyl-pyridine, 5-ethyl-2-methyl-pyridine, 4-dimethylamino-pyridine, N-methyl-piperidine, 1,4-diazabicyclo[2,2,2]-octane (DABCO), 1,5-diazabicyclo[4,3,0]-non-5-ene (DBN), or 1,8 diazabicyclo[5,4,0]-undec-7-ene (DBU).

The process according to the invention for preparing the compounds of the general formula (I) is, if appropriate, carried out using a diluent. Suitable diluents are especially inert organic solvents. These include, in particular, aliphatic, alicyclic or aromatic, optionally halogenated hydrocarbons, such as, for example, benzine, benzene, toluene, xylene, chlorobenzene, dichlorobenzene, petroleum ether, hexane, cyclohexane, dichloromethane, chloroform, carbon tetrachloride; ethers, such as diethyl ether, diisopropyl ether, dioxane, tetrahydrofuran or ethylene glycol dimethyl ether or ethylene glycol diethyl ether; ketones, such as acetone, butanone or methyl isobutyl ketone; nitriles, such as acetonitrile, propionitrile or butyronitrile; amides, such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methyl-formanilide, N-methyl-pyrrolidone or hexamethylphosphoric triamide; esters such as methyl acetate or ethyl acetate, sulphoxides, such as dimethyl sulphoxide, alcohols, such as methanol, ethanol, n- or i-propanol, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, mixtures thereof with water or pure water.

When carrying out the process according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 150°C, preferably between 10°C and 120°C.

The process according to the invention is generally carried out under atmospheric pressure. However, it is also possible to carry out the process according to the invention under elevated or reduced pressure – in general between 0.1 bar and 10 bar.

In carrying out the process according to the invention, the starting materials are generally employed in approximately equimolar amounts. However, it is also possible to employ a relatively large excess of one of the components. The reaction is generally carried out in a suitable diluent in the presence of a reaction auxiliary and the reaction mixture is generally stirred for a number of hours at the temperature required. Work-up is carried out by customary methods (cf. the Preparation Examples).

The active compounds according to the invention can be used as defoliants, desiccants, haulm killers and, especially, as weed-killers. By weeds in the broadest sense, there are to be understood all plants which grow in locations where they are not wanted. Whether the substances according to the invention act as total or selective herbicides depends essentially on the amount used.

The active compounds according to the invention can be used, for example, in connection with the following plants:

Dicotyledonous weeds of the genera: Sinapis, Lepidium, Galium, Stellaria, Matricaria, Anthemis, Galinsoga, Chenopodium, Urtica, Senecio, Amaranthus, Portulaca, Xanthium, Convolvulus, Ipomoea, Polygonum, Sesbania, Ambrosia, Cirsium, Carduus, Sonchus, Solanum, Rorippa, Rotala, Lindernia, Lamium, Veronica, Abutilon, Emex, Datura, Viola, Galeopsis, Papaver, Centaurea, Trifolium, Ranunculus and Taraxacum.

Dicotyledonous crops of the genera: Gossypium, Glycine, Beta, Daucus, Phaseolus, Pisum, Solanum, Linum, Ipomoea, Vicia, Nicotiana, Lycopersicon, Arachis, Brassica, Lactuca, Cucumis and Cucurbita.

Monocotyledonous weeds of the genera: Echinochloa, Setaria, Panicum, Digitaria, Phleum, Poa, Festuca, Eleusine, Brachiaria, Lolium, Bromus, Avena, Cyperus, Sorghum, Agropyron, Cynodon, Monochoria, Fimbristylis, Sagittaria, Eleocharis, Scirpus, Paspalum, Ischaemum, Sphenoclea, Dactyloctenium, Agrostis, Alopecurus, Apera, Aegilops and Phalaris.

Monocotyledonous crops of the genera: Oryza, Zea, Triticum, Hordeum, Avena, Secale, Sorghum, Panicum, Saccharum, Ananas, Asparagus and Allium.

However, the use of the active compounds according to the invention is in no way restricted to these genera, but also extends in the same manner to other plants.

The active compounds according to the invention are suitable, depending on the concentration, for the total control of weeds, for example on industrial terrain and railway tracks, and on paths and squares with or without tree plantings. Equally, the active compounds according to the invention can be employed for the control of weeds in perennial crops, for example forests, decorative tree plantings, orchards, vineyards, citrus groves, nut orchards, banana plantations, coffee plantations, tea plantations, rubber plantations, oil palm plantations, cocoa plantations, soft fruit plantings and hop fields, in lawns, turf and pasture-land, and for the selective control of weeds in annual crops.

The compounds of the formula (I) according to the invention have strong herbicidal activity and a broad activity spectrum when used on the soil and on above-ground parts of plants. To a certain extent, they are also suitable for the selective control of monocotyledonous and dicotyledonous weeds in monocotyledonous and dicotyledonous crops, both pre-emergence and post-emergence.

The active compounds can be converted into the customary formulations, such as solutions, emulsions, wettable powders, suspensions, powders, dusting agents, pastes, soluble powders, granules, suspo-emulsion concentrates, natural and synthetic materials impregnated with active compound, and very fine capsules in polymeric substances.

These formulations are produced in a known manner, for example by mixing the active compounds with extenders, that is liquid solvents and/or solid carriers, optionally with the use of surfactants, that is emulsifiers and/or dispersants and/or foam formers.

If the extender used is water, it is also possible to employ, for example, organic solvents as auxiliary solvents. Suitable liquid solvents are essentially the following: aromatics, such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics and chlorinated aliphatic hydrocarbons, such as chlorobenzenes, chloroethylenes or

methylene chloride, aliphatic hydrocarbons, such as cyclohexane or paraffins, for example petroleum fractions, mineral and vegetable oils, alcohols, such as butanol or glycol and also their ethers and esters, ketones, such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, such as dimethylformamide and dimethyl sulphoxide, and also water.

Suitable solid carriers are: for example ammonium salts and ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and ground synthetic minerals, such as finely divided silica, alumina and silicates; suitable solid carriers for granules are: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, and also synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; suitable emulsifying and/or foam-forming agents are: for example nonionic and anionic emulsifiers, such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates as well as protein hydrolysates; suitable dispersing agents are: for example lignin-sulphite waste liquors and methylcellulose.

Tackifiers such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latexes, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, as well as natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Other possible additives are mineral and vegetable oils.

It is possible to use colorants such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyes, such as alizarin dyes, azo dyes and metal phthalocyanine dyes, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

The formulations in general contain between 0.1 and 95 per cent by weight of active compound, preferably between 0.5 and 90%.

For the control of weeds, the active compounds according to the invention, as such or in their formulations, can also be used as mixtures with known herbicides, finished formulations or tank mixes being possible.

Possible components for the mixtures are known herbicides, for example

acetochlor, acifluorfen(-sodium), aclonifen, alachlor, alloxydim(-sodium), ametryne, amidochlor, amidosulfuron, anilofos, asulam, atrazine, azafenidin, azimsulfuron, benazolin(-ethyl), benfuresate, bensulfuron(-methyl), bentazone, benzobicyclon, benzofenap, benzoylprop(-ethyl), bialaphos, bifenox, bispyribac(-sodium), bromobutide, bromofenoxim, bromoxynil, butachlor, butroxydim, butylate, cafenstrole, caloxydim, carbetamide, carfentrazone(-ethyl), chlomethoxyfen, chloramben, chloridazon, chlorimuron(-ethyl), chlornitrofen, chlorsulfuron, chlorotoluron, cinidon(-ethyl), cinmethylin, cinosulfuron, clefoxydim, clethodim, clodinafop(-propargyl), clomazone, clomeprop, clopyralid, clopyrasulfuron(-methyl), cloransulam(-methyl), cumyluron, cyanazine, cybutryne, cycloate, cyclosulfamuron, cycloxydim, cyhalofop(-butyl), 2,4-D, 2,4-DB, 2,4-DP, desmedipham, diallate, dicamba, diclofop(-methyl), diclosulam, diethatyl(-ethyl), difenzoquat, diflufenican, diflufenzopyr, dimefuron, dimepiperate, dimethachlor, dimethametryn, dimethenamid, dimexyflam, dinitramine, diphenamid, diquat, dithiopyr, diuron, dymron, epoprodan, EPTC, esprocarb, ethalfluralin, ethametsulfuron(-methyl), ethofumesate, ethoxyfen, ethoxysulfuron, etobenzanid, fenoxaprop(-P-ethyl), fentrazamide, flamprop(-isopropyl), flamprop(-isopropyl-L), flamprop(-methyl), flazasulfuron, florasilam, fluazifop(-P-butyl), fluazolate, flucarbazone, flufenacet, flumetsulam, flumiclorac(-pentyl), flumioxazin, flumipropyn, flumetsulam, fluometuron, fluorochloridone, fluoroglycofen(-ethyl), flupoxam, flupropacil, flurpyrsulfuron(-methyl, -sodium), flurenol(-butyl), fluridone, fluroxypyr(-methyl), flurprimidol, flurtamone, fluthiacet(-methyl), fluthiamide, fomesafen, glufo-

sinate(-ammonium), glyphosate(-isopropylammonium), halosafen, haloxyfop(-ethoxyethyl), haloxyfop(-P-methyl), hexazinone, imazamethabenz-(-methyl), imazamethapyr, imazamox, imazapic, imazapyr, imazaquin, imazethapyr, imazosulfuron, iodosulfuron(-methyl, -sodium), ioxynil, isopropalin, isoproturon, isouron, isoxaben, isoxachlortole, isoxaflutole, isoxapyrifop, lactofen, lenacil, linuron, MCPA, MCPP, mefenacet, mesotrione, metamitron, metazachlor, methabenzthiazuron, metobenzuron, metobromuron, (alpha-)metolachlor, metosulam, metoxuron, metribuzin, metsulfuron(-methyl), molinate, monolinuron, naproanilide, napropamide, neburon, nicosulfuron, norflurazon, orbencarb, oryzalin, oxadiargyl, oxadiazon, oxasulfuron, oxaziclomefone, oxyfluorfen, paraquat, pelargonic acid, pendimethalin, pendralin, pentoxazone, phenmedipham, piperophos, pretilachlor, primisulfuron(-methyl), prometryn, propachlor, propanil, propaquizafop, propisochlor, propyzamide, prosulfocarb, prosulfuron, pyraflufen(-ethyl), pyrazolate, pyrazosulfuron(-ethyl), pyrazoxyfen, pyribenzoxim, pyributicarb, pyridate, pyriminobac-(-methyl), pyrithiobac(-sodium), quinchlorac, quinmerac, quinoclamine, quizalofop(-P-ethyl), quizalofop(-P-tefuryl), rimsulfuron, sethoxydim, simazine, simetryn, sulcotrione, sulfentrazone, sulfometuron(-methyl), sulfosate, sulfosulfuron, tebutam, tebuthiuron, tepraloxydim, terbuthylazine, terbutryn, thenylchlor, thiafluamide, thiazopyr, thidiazimin, thifensulfuron(-methyl), thiobencarb, tiocarbazil, tralkoxydim, triallate, triasulfuron, tribenuron(-methyl), triclopyr, tridiphane, trifluralin and triflusulfuron.

A mixture with other known active compounds, such as fungicides, insecticides, acaricides, nematicides, bird repellents, plant nutrients and agents which improve soil structure, is also possible.

The active compounds can be used as such, in the form of their formulations or in the use forms prepared therefrom by further dilution, such as ready-to-use solutions, suspensions, emulsions, powders, pastes and granules. They are used in the customary manner, for example by watering, spraying, atomizing or scattering.

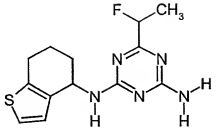
The active compounds according to the invention can be applied either before or after emergence of the plants. They can also be incorporated into the soil before sowing.

The amount of active compound used can vary within a relatively wide range. It depends essentially on the nature of the desired effect. In general, the amounts used are between 1 g and 10 kg of active compound per hectare of soil surface, preferably between 5 g and 5 kg per ha.

The preparation and use of the active compounds according to the invention can be seen from the following examples.

Preparation Examples:

Example 1



(Process with integrated preparation of the starting material of the formula (II))

A mixture of 3.5 g (18.4 mmol) of 4,5,6,7-tetrahydrobenzo[*b*]thiophen-4-yl-amine hydrochloride and 1.6 g (18.4 mmol) of cyanoguanidine is heated at 150°C for two hours, then cooled in an acetone/dry ice bath and stirred with diethyl ether. The resulting crystalline solid is separated off by filtration and dissolved in 50 ml of methanol. The solution is admixed with 6.6 g (46.7 mmol) of sodium sulphate and, at room temperature (about 20°C), 1.4 g (13.3 mmol) of methyl 2-fluoro-propanoate and 2.1 g (12.1 mmol) of sodium methoxide are then added successively. The reaction mixture is stirred at room temperature for 20 hours and subsequently concentrated under water-pump vacuum. The residue is partitioned between water and dichloromethane and the organic phase is separated off, dried over sodium sulphate and filtered. The filtrate is concentrated under water-pump vacuum and the residue is purified by column chromatography (silica gel, ethyl acetate/hexane, vol.: 20:80)).

This gives 0.84 g (16% of theory) of 2-amino-4-(1-fluoro-ethyl)-6-(4,5,6,7-tetra-hydrobenzo[*b*]thiophen-4-yl-amino)-1,3,5-triazine as a pale yellow oil

logP = 4.26 [a)]

Analogously to Example 1, and in accordance with the general description of the preparation process according to the invention, it is also possible to prepare, for example, the compounds of the general formula (I) listed in Table 1 below.

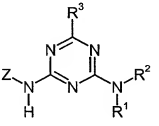
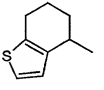
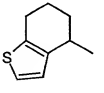
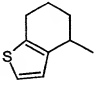
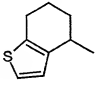
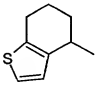
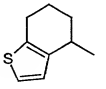
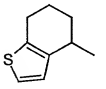
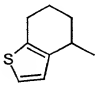
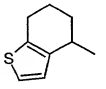
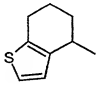
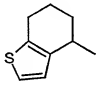
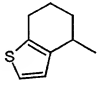
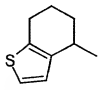
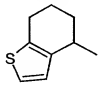
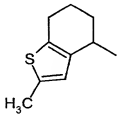
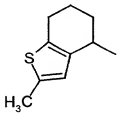
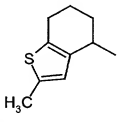
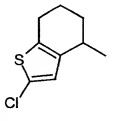
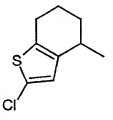
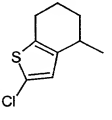
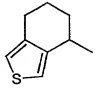
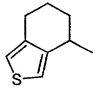
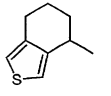
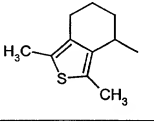
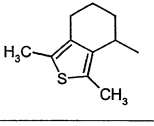


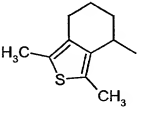
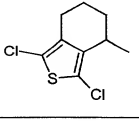
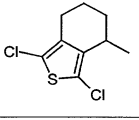
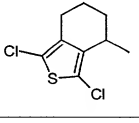
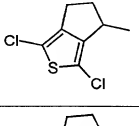
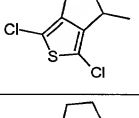
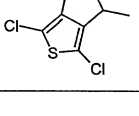
Table 1: Examples of the compounds of the formula (I)

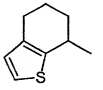
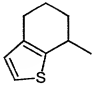
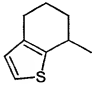
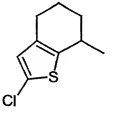
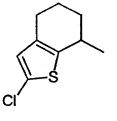
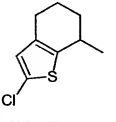
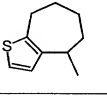
Ex. No.	R^1	R^2	R^3	Z	Physical Data
2	-	NR^1R^2: 	$CHFCH_3$		
3	H	-CO-CH_3	$CHFCH_3$		
4	H	-CO-C_2H_5	$CHFCH_3$		
5	H	H	$CF(CH_3)_2$		logP = 1.75 [a)]

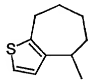
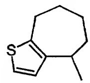
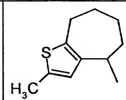
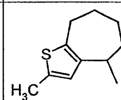
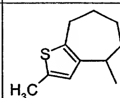
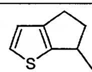
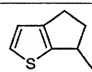
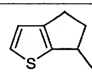
Ex. No.	R^1	R^2	R^3	Z	Physical Data
6	-	NR^1R^2: 	$CF(CH_3)_2$		logP = 2.67 [b]
7	H	-CO-CH_3	$CF(CH_3)_2$		logP = 2.66 [a]
8	H	-CO-C_2H_5	$CF(CH_3)_2$		logP = 2.93 [a]
9	H	H	$CHCl_2$		
10	H	H	CF_2Cl		logP = 3.01 [a]
11	H	H	C_2F_5		
12	H	H	CH_2OCH_3		
13	H	H	n-C_3H_7		logP = 1.61 [a]

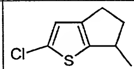
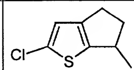
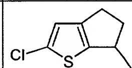
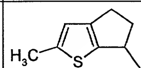
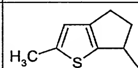
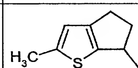
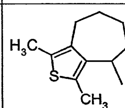
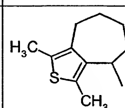
Ex. No.	R^1	R^2	R^3	Z	Physical Data
14	H	H	i-C_3H_7		
15	H	H	CF_3		
16	H	H	CF_3		logP = 3.27 [a)]
17	H	H	$CHFCH_3$		logP = 1.97 [a)]
18	H	H	$CF(CH_3)_2$		logP = 2.03 [a)]
19	H	H	CF_3		

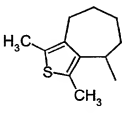
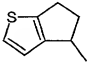
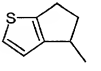
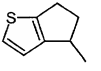
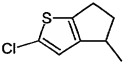
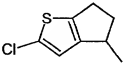
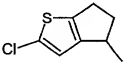
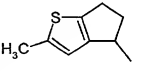
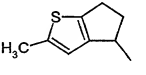
Ex. No.	R^1	R^2	R^3	Z	Physical Data
20	H	H	$CHFCH_3$		
21	H	H	$CF(CH_3)_2$		
22	H	H	CF_3		
23	H	H	$CHFCH_3$		
24	H	H	$CF(CH_3)_2$		
25	H	H	CF_3		
26	H	H	$CHFCH_3$		logP = 2.21[a)]

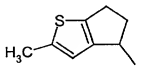
Ex. No.	R^1	R^2	R^3	Z	Physical Data
27	H	H	$CF(CH_3)_2$		
28	H	H	CF_3		
29	H	H	$CHFCH_3$		
30	H	H	$CF(CH_3)_2$		
31	H	H	CF_3		
32	H	H	$CHFCH_3$		
33	H	H	$CF(CH_3)_2$		

Ex. No.	R^1	R^2	R^3	Z	Physical Data
34	H	H	CF_3		
35	H	H	$CHFCH_3$		
36	H	H	$CF(CH_3)_2$		
37	H	H	CF_3		
38	H	H	$CHFCH_3$		
39	H	H	$CF(CH_3)_2$		
40	H	H	CF_3		

Ex. No.	R^1	R^2	R^3	Z	Physical Data
41	H	H	$CHFCH_3$		
42	H	H	$CF(CH_3)_2$		
43	H	H	CF_3		logP = 3.47[a)]
44	H	H	$CHFCH_3$		logP = 2.16[a)]
45	H	H	$CF(CH_3)_2$		
46	H	H	CF_3		
47	H	H	$CHFCH_3$		
48	H	H	$CF(CH_3)_2$		

Ex. No.	R^1	R^2	R^3	Z	Physical Data
49	H	H	CF_3		
50	H	H	$CHFCH_3$		
51	H	H	$CF(CH_3)_2$		
52	H	H	CF_3		
53	H	H	$CHFCH_3$		
54	H	H	$CF(CH_3)_2$		
55	H	H	CF_3		
56	H	H	$CHFCH_3$		logP = 2.47[a)]

Ex. No.	R^1	R^2	R^3	Z	Physical Data
57	H	H	$CF(CH_3)_2$		
58	H	H	CF_3		
59	H	H	$CHFCH_3$		
60	H	H	$CF(CH_3)_2$		
61	H	H	CF_3		
62	H	H	$CHFCH_3$		
63	H	H	$CF(CH_3)_2$		
64	H	H	CF_3		
65	H	H	$CHFCH_3$		

Ex. No.	R^1	R^2	R^3	Z	Physical Data
66	H	H	$CF(CH_3)_2$		

The logP values given in Example 1 and in Table 1 were determined in accordance with EEC Directive 79/831 Annex V.A8 by HPLC (High Performance Liquid Chromatography) using a reversed-phase column (C 18). Temperature: 43°C.

(a) Mobile phases for the determination in the acidic range: 0.1% aqueous phosphoric acid, acetonitrile; linear gradient from 10% acetonitrile to 90% acetonitrile – the corresponding data are labelled in Table 1 with a).

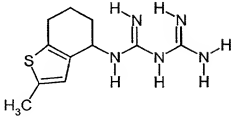
(b) Mobile phases for the determination in the neutral range: 0.01 molar aqueous phosphate buffer solution, acetonitrile; linear gradient from 10% acetonitrile to 90% acetonitrile – corresponding data are labelled in Table 1 with b).

Calibration was carried out using unbranched alkan-2-ones (with from 3 to 16 carbon atoms) whose logP values are known (determination of the logP values by the retention times using linear interpolation between two successive alkanones).

The lambda max values were determined using the UV spectra from 200 nm to 400 nm in the maxima of the chromatographic signals.

Starting materials of the formula (II):

Example II-1



x HCl

A mixture of 24.9 g (0.122 mol) of 2-methyl-4,5,6,7-tetrahydrobenzo[*b*]thiophen-4-yl-amine hydrochloride and 10.3 g (0.122 mol) of cyanoguanidine is heated at 150°C for one hour and subsequently cooled in an acetone/dry ice bath. At –78°C, the reaction mixture is stirred with acetone and the resulting solid is filtered off, stirred at room temperature with diethyl ether and once again filtered.

This gives 27.3 g (78% of theory) of 2-methyl-4,5,6,7-tetrahydrobenzo[*b*]thiophen-4-yl-biguanide hydrochloride as a dark brown solid (logP = 1.12 [a.]).

Analogously to Example II-1, it is also possible to prepare, for example, the compounds of the general formula (II) listed in Table 2 below.

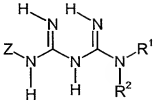
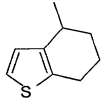
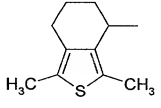
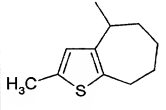
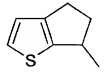


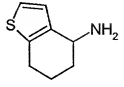
Table 2: Examples of the compounds of the formula (II)

R^1 and R^2 in each case represent hydrogen

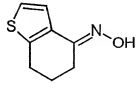
Ex. No.	Z	Physical Data
II-2		LogP = 0.73 a.)
II-3		
II-4		
II-5		

Starting materials of the formula (IV):

Example IV-1



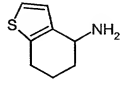
Step 1



77.3 g (0.51 mol) of 6,7-dihydro-benzo[*b*]thiophen-4(5*H*)-one together with 69.5 g (1.0 mol) of hydroxylamine hydrochloride are stirred in 600 ml of pyridine at room temperature (about 20°C) for two hours. The reaction mixture is subsequently poured into 1 litre of water, a pH of 1 is adjusted using conc. hydrochloric acid and the mixture is extracted with ethyl acetate. The organic extract solution is dried over sodium sulphate and filtered. The filtrate is concentrated under water-pump vacuum and the residue which is obtained as a solid is stirred with petroleum ether and isolated by filtration with suction.

This gives 74.5 g (88% of theory) of 6,7-dihydro-benzo[*b*]thiophen-4(5*H*)-oxime as a 1:2 mixture of the *E*/*Z* isomers.

Step 2



A solution of 8.4 g (50 mmol) of 6,7-dihydro-benzo[*b*]thiophen-4(5*H*)-oxime in 50 ml of 1,2-dimethoxy-ethane is added dropwise at 0°C to a mixture of 20.0 g (105 mmol) of titanium(IV) chloride and 8.0 g (210 mmol) of sodium borohydride in 200 ml of 1,2-dimethoxy-ethane. The reaction mixture is kept in the ice/water bath and stirred for about 20 hours. For work-up, the mixture is poured into water and a pH of 9 is adjusted using 25% strength ammonia solution. The resulting precipitate is separated off by filtration through Cellite, and the filtrate is extracted with dichloromethane. The organic extract solution is dried over sodium sulphate and filtered. The filtrate is concentrated under water-pump vacuum.

This gives 4.5 g (59% of theory) of 4,5,6,7-tetra-hydro-benzo[*b*]thiophen-4-yl-amine as a colourless oil.

The hydrochloride of the compound obtained according to Example IV-1 can be prepared, for example, as follows:

A mixture of 4.1 g (27 mmol) of 4,5,6,7-tetrahydro-benzo[*b*]thiophen-4-yl-amine, 4 ml of conc. hydrochloric acid and 50 ml of methanol is stirred at room temperature (about 20°C) for one hour and subsequently concentrated under water-pump vacuum. The residue is stirred with diethyl ether and the resulting crystalline product is isolated by filtration with suction.

This gives 3.8 g (75% of theory) of 4,5,6,7-tetrahydro-benzo[*b*]thiophen-4-yl-amine hydrochloride as a brown solid.

Use Examples:

Example A

Pre-emergence test

Solvent: 5 parts by weight of acetone

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

Seeds of the test plants are sown in normal soil. After about 24 hours, the soil is sprayed with the preparation of active compound such that the particular amount of active compound desired is applied per unit area. The concentration of the spray liquor is chosen so that the particular amount of active compound desired is applied in 1000 litre of water per hectare.

After three weeks, the degree of damage to the plants is rated in % damage in comparison to the development of the untreated control.

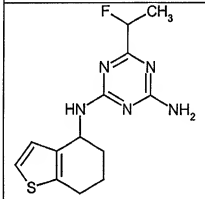
The figures denote:

0 % = no effect (like untreated control)

100 % = total destruction

In this test, for example, the compound according to Preparation Example 1 shows strong activity against weeds.

.Table A: Pre-emergence test/greenhouse

Active compound according to Preparation Example No.	Application rate g of ai./ha	Alopecurus	Setaria	Abutilon	Amaranthus	Galium
						
(1)	500	100	100	95	100	90

Example B

Post-emergence test

Solvent: 5 parts by weight of acetone
Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

Test plants which have a height of 5 – 15 cm are sprayed with the preparation of active compound such that the particular amounts of active compound desired are applied per unit area. The concentration of the spray liquor is chosen so that the particular amounts of active compound desired are applied in 1000 l of water/ha.

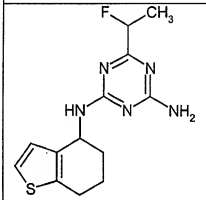
After three weeks, the degree of damage to the plants is rated in % damage in comparison to the development of the untreated control.

The figures denote:

0 % = no effect (like untreated control)
100 % = total destruction

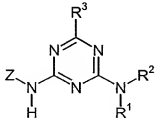
In this test, for example, the compound of Preparation Example 1 shows strong activity against weeds.

Table B: Post-emergence test/greenhouse

Active compound according to Preparation Example No.	Application rate g of ai./ha	Alopecurus	Setaria	Amaranthus	Sinapis	Xanthium
						
(1)	500	95	100	100	100	100

Patent Claims

1. Compounds of the general formula (I)



(I),

in which

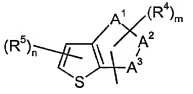
R^1 represents hydrogen or represents optionally substituted alkyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl,

or the grouping $N(R^1R^2)$ also represents dialkylaminoalkylideneamino,

R^3 represents hydrogen, represents halogen, represents optionally substituted alkyl, represents in each case optionally substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, represents in each case optionally substituted alkenyl or alkinyl, or represents optionally substituted cycloalkyl, and

Z represents one of the thienocycloalk(en)yl groupings below



(Z^1) (Z^2)

in which

m represents the numbers 0, 1, 2, 3 or 4,

n represents the numbers 0, 1 or 2,

A^1 represents O (oxygen), S (sulphur), –CO-, -CS- or alkanediyl (alkylene),

A^2 represents O (oxygen), S (sulphur), –CO-, -CS- or alkanediyl (alkylene),

A^3 represents O (oxygen), S (sulphur), –CO-, -CS- or alkanediyl (alkylene),

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl and that two adjacent groups do not simultaneously represent S or O -

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino,

alkenyl, alkinyl, alkenylcarbonyl, alkinylcarbonyl, aryl, arylcarbonyl or arylalkyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, or represents in each case optionally substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino, alkylsulphonylamino, alkenyl, alkinyl, alkenylcarbonyl, alkinylcarbonyl, aryl, arylcarbonyl or arylalkyl.

2. Compounds according to Claim 1, characterized in that

m represents the numbers 0, 1 or 2,

A^1 represents O (oxygen), S (sulphur), -CO-, -CS- or alkanediyl (alkylene) having 1 to 3 carbon atoms,

A^2 represents O (oxygen), S (sulphur), -CO-, -CS- or alkanediyl (alkylene) having 1 to 3 carbon atoms,

A^3 represents O (oxygen), S (sulphur), -CO-, -CS- or alkanediyl (alkylene) having 1 to 3 carbon atoms,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents alkanediyl having 1 to 3 carbon atoms and that two adjacent groups do not simultaneously represent S or O -

R^1 represents hydrogen or represents optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl having 1 to 6 carbon atoms,

R^2 represents hydrogen, represents formyl or represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxycarbonyl or alkylaminocarbonyl having in each case 1 to 6 carbon atoms in the alkyl groups, or

the grouping $N(R^1R^2)$ represents dialkylaminoalkylideneamino having in each case up to 4 carbon atoms in the alkyl groups or alkylidene groups,

R^3 represents hydrogen, represents halogen, represents optionally cyano-, halogen-, hydroxyl-, C_1-C_4-alkoxy- or C_1-C_4-alkylthio-substituted alkyl having 1 to 6 carbon atoms, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkylcarbonyl, alkoxycarbonyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally halogen-substituted alkenyl or alkinyl having in each case 2 to 6 carbon atoms, or represents optionally cyano-, halogen- or C_1-C_4-alkyl-substituted cycloalkyl having 3 to 6 carbon atoms,

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogenoalkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxycarbonyl-substituted aryl, arylcarbonyl or arylalkyl having in each

case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, halogen, represents in each case optionally cyano-, halogen- or C_1-C_4-alkoxy-substituted alkyl, alkylcarbonyl, alkoxy, alkoxycarbonyl, alkylthio, alkylsulphinyl, alkylsulphonyl, alkylamino, dialkylamino, alkylcarbonylamino, alkoxycarbonylamino or alkylsulphonylamino having in each case 1 to 6 carbon atoms in the alkyl groups, represents in each case optionally cyano- or halogen-substituted alkenyl, alkinyl, alkenylcarbonyl or alkinylcarbonyl having in each case 2 to 6 carbon atoms in the alkenyl or alkinyl groups, or represents in each case optionally nitro-, cyano-, halogen-, C_1-C_4-alkyl-, C_1-C_4-halogeno-alkyl-, C_1-C_4-alkoxy-, C_1-C_4-halogenoalkoxy- or C_1-C_4-alkoxy-carbonyl substituted aryl, arylcarbonyl or arylalkyl having in each case 6 or 10 carbon atoms in the aryl group and optionally 1 to 4 carbon atoms in the alkyl moiety.

3. Compounds according to Claim 1 or 2, characterized in that

A^1 represents O (oxygen), S (sulphur), -CO-, -CS-, methylene, dimethylene or trimethylene,

A^2 represents O (oxygen), S (sulphur), -CO-, -CS-, methylene, dimethylene or trimethylene,

A^3 represents O (oxygen), S (sulphur), -CO-, -CS-, methylene, dimethylene or trimethylene,

- with the proviso that at least one of the groupings A^1, A^2, A^3 represents methylene, dimethylene or trimethylene and that two adjacent groups do not simultaneously represent S or O -

R^1 represents hydrogen or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl,

R^2 represents hydrogen, represents formyl or represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylaminocarbonyl, ethylaminocarbonyl, n- or i-propylaminocarbonyl, or

the grouping $N(R^1R^2)$ represents dimethylaminomethyleneamino or diethylaminomethyleneamino,

R^3 represents hydrogen, represents fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, bromine-, hydroxyl-, methoxy-, ethoxy-, n- or i-propoxy-, methylthio-, ethylthio-, n- or i-propylthio-substituted methyl, ethyl, n- or i-propyl, n-, i- or s-butyl, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy- substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methoxy, ethoxy, n- or i-propoxy, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, represents in each case optionally fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl or butinyl, or represents in each case optionally cyano-, fluorine-, chlorine-, methyl-

or ethyl-substituted cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl,

R^4 represents amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl, ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, , methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl, and

R^5 represents nitro, amino, cyano, carbamoyl, thiocarbamoyl, formyl, fluorine, chlorine, bromine, represents in each case optionally cyano-, fluorine-, chlorine-, methoxy- or ethoxy-substituted methyl, ethyl, n- or i-propyl, acetyl, propionyl, n- or i-butyroyl, methoxy, ethoxy, n- or i-propoxy, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, methylthio, ethylthio, n- or i-propylthio, methylsulphinyl,

ethylsulphinyl, n- or i-propylsulphinyl, methylsulphonyl, ethylsulphonyl, n- or i-propylsulphonyl, methylamino, ethylamino, n- or i-propylamino, dimethylamino, diethylamino, acetylamino, propionylamino, n- or i-butyroylamino, methoxycarbonylamino, ethoxycarbonylamino, n- or i-propoxycarbonylamino, methylsulphonylamino, ethylsulphonylamino, n- or i-propylsulphonylamino, represents in each case optionally cyano-, fluorine-, chlorine- or bromine-substituted ethenyl, propenyl, butenyl, ethinyl, propinyl, butinyl, ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl, ethinylcarbonyl, propinylcarbonyl or butinylcarbonyl, or represents in each case optionally nitro-, cyano-, fluorine-, chlorine-, bromine-, methyl-, ethyl-, n- or i-propyl-, n-, i-, s- or t-butyl-, trifluoromethyl-, methoxy-, ethoxy-, n- or i-propoxy-, difluoromethoxy-, trifluoromethoxy-, methoxycarbonyl-, ethoxycarbonyl-, n- or i-propoxycarbonyl-substituted phenyl, benzoyl or benzyl.

4. Compounds according to any of Claims 1 to 3, characterized in that

A^1 represents methylene or dimethylene,

A^2 represents methylene or dimethylene,

A^3 represents methylene or dimethylene,

R^1 represents hydrogen,

R^2 represents hydrogen, represents formyl or represents in each case optionally fluorine-, chlorine-, methoxy- or ethoxy-substituted acetyl, propionyl, n- or i-butyroyl, methoxycarbonyl, ethoxycarbonyl, n- or i-propoxycarbonyl, or

the grouping $N(R^1R^2)$ represents dimethylaminomethyleneamino,

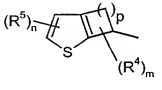
R^3 represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, n- or i-propyl,

R^4 represents cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy, and

R^5 represents nitro, cyano, fluorine, chlorine, bromine, or represents in each case optionally fluorine- or chlorine-substituted methyl, ethyl, methoxy or ethoxy.

5. Compounds according to any of claims 1 to 4, characterized in that

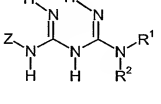
Z represents



where

p represents 2, 3 or 4, and n, m, R^4 and R^5 are as defined in any of Claims 1 to 4.

6. Process for preparing substituted triazines according to any of Claims 1 to 5, characterized in that biguanides of the general formula (II)



(II),

in which

R^1, R^2 and Z are as defined in any of Claims 1 to 5,

and/or acid adducts of compounds of the general formula (II)

are reacted with alkoxycarbonyl compounds of the general formula (III)

$$R^3\text{-CO-OR}' \qquad \text{(III)}$$

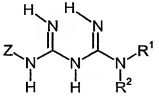
in which

R^3 is as defined in any of Claims 1 to 4 and

R' represents alkyl,

if appropriate in the presence of a reaction auxiliary and if appropriate in the presence of a diluent, and, if appropriate, further conversions within the scope of the definition of the substituents are carried out by customary methods on the resulting compounds of the general formula (I).

7. Compounds of the formula (II)



(II),

characterized in that

R^1, R^2 and Z are as defined in any of Claims 1 to 5,

and the acid adducts of the compounds of the general formula (II).

8. Process for preparing compounds according to Claim 7, characterized in that amino compounds of the general formula (IV)

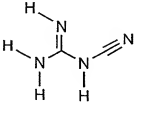
$$Z\text{-}NH_2 \qquad (IV)$$

in which

Z is as defined in any of Claims 1 to 5,

and/or acid adducts of compounds of the general formula (IV)

are reacted with cyanoguanidine of the formula (V)



(V)

if appropriate in the presence of a reaction auxiliary and if appropriate in the presence of a diluent at temperatures between 100°C and 200°C.

9. Method for controlling undesirable vegetation, characterized in that at least one compound according to any of Claims 1 to 5 is allowed to act on undesirable plants and/or their habitats.

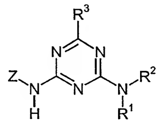
10. Use of at least one compound according to any of Claims 1 to 5 for controlling undesirable plants.

11. Herbicidal composition, characterized in that it comprises a compound according to any of Claims 1 to 5 and customary extenders and/or surfactants.

Substituted thienocycloalk(en)ylamino-1,3,5-triazines

Abstract

The invention relates to novel substituted thienocycloalk(en)ylamino-1,3,5-triazines of the general formula (I)



(I),

in which Z, R^1, R^2 and R^3 are as defined in the description, and to processes for their preparation, to their use as herbicides and to the intermediates required for their preparation, including their preparation processes in the case of the preferred compounds.

COMBINED DECLARATION AND POWER OF ATTORNEY	ATTORNEY DOCKET NO

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

SUBSTITUTED THIENOCYCLOALK(EN)YLAMINO-1,3,5-TRIAZINE

the specification of which is attached hereto,

or was filed on **May 2, 2000**

as a PCT Application Serial No. **PCT/EP00/03928**

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s), the priority(ies) of which is/are to be claimed:

199 21 883.8	**Germany**	**May 12, 1999**
(Number)	(Country)	(Month/Day/Year Filed)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose the material information as defined in Title 37, Code of Federal Regulations, §1.56 which occured between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and this application and to transact all business in the Patent and Trademark Office conne

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POST OFFICE ADDRESS

FULL NAME OF TENTH INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENCE	CITIZENSHIP

POST OFFICE ADDRESS

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